

ATTACHMENT 2

**WASTE ANALYSIS
PLAN**

for

**Lewisite Neutralization
System
at CAMDS**

ATTACHMENT 2 LNSC WASTE ANALYSIS PLAN

2.1 INTRODUCTION

Generators of hazardous waste are required to obtain detailed chemical analyses of wastes they intend to treat, store, or dispose of in order to ensure proper hazardous waste management practices. The following subsections address the various components of the Waste Analysis Plan for waste streams specifically related to operation of the Lewisite Neutralization System at CAMDS (LNSC).

Specifically, this Waste Analysis Plan describes:

the physical and chemical analyses the CAMDS will perform before hazardous wastes are stored, treated, or transported off-site for further treatment and ultimate disposal,

the methods to be used to collect samples,

the frequency of sampling and analysis,

the methods to be used to analyze the samples,

the procedures that will be used to ensure the validity of the analytical results, and

the basis for generator knowledge.

2.2 PARAMETERS AND RATIONALE [40 CFR 264.13(b)(1); R315-8-2.4]

The descriptions of wastes generated by LNSC operations, analytical methods, and rationale for their selection are described for each waste category in the paragraphs that follow. Table 2.1 presents a summary of this entire waste analysis plan. For each waste stream specified, this table presents the selected analytical parameters and corresponding analytical methods, sampling frequencies, and sampling methods.

2.2.1 Chemical Agent, Lewisite

Prior to treatment in the LNSC process, each ton container of chemical agent Lewisite will be analyzed for percent agent purity, specific gravity and HRA metals (i.e., Aluminum, Antimony, Beryllium, Boron, Cobalt, Copper, Manganese, Nickel, Thallium, Tin, Vanadium, and Zinc, hereafter referred to as HRA metals). These analyses will provide information necessary for proper management of this waste during the LNSC process. Lewisite was prepared to known U.S. Government standards and this information may be referenced as necessary. Physical descriptions (i.e., weight measurements, count, banding, color, lot numbers) will be verified prior to treatment. Chemical agent Lewisite will be managed as a P999 hazardous waste.

2.2.2 Empty Ton Containers

These ton containers (TCs) were used to store Lewisite. Any residue remaining in the emptied TCs will be removed with a high-pressure water rinse. Prior to rinsing, empty TCs will be managed as a P999 hazardous waste. Rinsate will be collected and transferred directly to the LNSC main reactor vessel (PV-110). Following the rinse procedure, the internal cavity of each TC is monitored via MINICAMS® to verify an airborne Lewisite concentration of less than 1.0 TWA (Time Weighted Average, 0.003 mg/m^3) for safety purposes. The ton containers will be sampled and any residue will be analyzed for TCLP metals and organics. Ton containers may be recycled at an approved smelter after treatment in the CAMDS metal parts furnace and after approval of a Miscellaneous Waste trial burn.

2.2.3 LNSC Process Effluent

Lewisite is oxidized and neutralized to a solution of sodium arsenate and sodium chloride by the LNSC process. This effluent solution will be managed as a F999 waste and will be analyzed for Lewisite Oxide content and pH. When the measured concentration of Lewisite Oxide drops below 1.0 mg/L (1.0 ppm), the process effluent solution will be transferred from the neutralization process recirculation loop to tank T-130 (neutralized product storage tank). Due to its inherent arsenic content, this effluent will be further treated by solidification/stabilization prior to final disposal in a RCRA Subtitle C landfill.

2.2.4 Spent Decontamination Solution-Lewisite (SDS-L)

2.2.4.1 Spent Decontamination Solution (SDS-L) is generated from the Lewisite treatment process, decontamination of personnel and operations areas, and the rinsing of Lewisite Ton Containers. These solutions are composed mainly of dilute sodium hydroxide (NaOH) and water. However, trace amounts of Lewisite or other arsenic compounds may be present. SDS-L will be managed as F999 hazardous waste.

2.2.4.2 These solutions will be pumped from the sump/waste liquid collection system into the Decontamination Fluid Storage Tank (T-140) where they will be held temporarily prior to being reintroduced into the neutralization process as a supplement to the sodium hydroxide feedstock. Each batch of SDS-L held in T-140 will be analyzed for NaOH concentration by titration. This information will be used to determine proper SDS feed back into the process. If spent decon solution in tank T-140 is not fed into the LNSC process then it must be sampled for L, TCLP metals, and organics before it can be disposed in a RCRA subtitle C landfill.

2.2.5 Process Equipment/Tanks

2.2.5.1 Includes all process equipment used in the LNSC. This equipment may or may not be contaminated with Lewisite and consists of such items as tanks/tank internals, pumps, pressure vessels, piping and instrumentation that will be discarded when this project is complete. This waste stream also includes: manganese dioxide catalyst (catalytic reactor), ATF containment liner, and other

process related solids. Items in this waste stream will be managed as F999 hazardous waste at a minimum.

- 2.2.5.2 These items will be decontaminated, and then monitored via MINICAMS® to verify an airborne Lewisite concentration of less than 1.0 TWA (0.003 mg/m³) for safety purposes. The decontamination residues from this process will then be analyzed for, L, TCLP metals and organics to determine whether further stabilization treatment of the process equipment is necessary prior to final disposal in a RCRA Subtitle C landfill.

2.2.6 Spent Carbon Filter Media

This material comes from the ATF air filtering system. The spent carbon will be monitored via MINICAMS® to verify an airborne Lewisite concentration of less than 1.0 TWA (0.003 mg/m³) for safety purposes. Spent carbon will be managed as P999 hazardous waste. Spent carbon will be managed and stored until an appropriate method of treatment or disposal has been approved by the Executive Secretary.

2.2.7 Non-Carbon Filter Media

This material includes high efficiency particulate air (HEPA) filters and other non-carbon filters as part of the facility air filtering system. These materials will be monitored via MINICAMS® to verify an airborne Lewisite concentration of less than 1.0 TWA (0.003 mg/m³) for safety purposes. These wastes will then be analyzed for TCLP metals, organics and Lewisite to determine whether further stabilization treatment is necessary. This waste stream will be managed as P999 hazardous waste. Spent non-carbon filter media will be incinerated in the CAMDS metal parts furnace after approval of appropriate trial burns. Alternatively, this material may be disposed in a RCRA subtitle C landfill if analysis shows a concentration of 1 ppm L or less in the filter material.

2.2.8 Contaminated PPE (Lewisite)

Contaminated personal protective equipment (PPE) will be managed and stored until an appropriate method of treatment or disposal has been approved by the Executive Secretary.

2.2.9 Liquid Laboratory Wastes (Lewisite)

- 2.2.9.1 Lewisite related liquid laboratory / monitoring wastes will be managed as F999 hazardous waste because these wastes may contain residues from the treatment of Lewisite. Liquid lab wastes are analyzed to verify a Lewisite concentration of less than 1 ppm prior to being released for stabilization treatment followed by shipment to a RCRA Subtitle C landfill.
- 2.2.9.2 These wastes may also contain other hazardous constituents (such as spent laboratory solvents and toxic metals) used during analytical procedures. Consequently, these liquids will be analyzed for ignitability, corrosivity (pH), TCLP metals (totals) and volatile organic compounds.

- 2.2.10 Solid Laboratory/Monitoring Wastes (Lewisite)
- 2.2.10.1 This waste stream consists of discarded solid equipment / materials which were used during analytical procedures and may have been contaminated with chemical agent, Lewisite. These include, but are not limited to laboratory glassware, paper, rubber gloves, plastic tubing, and metal parts from laboratory equipment. This waste stream will be managed as F999 hazardous waste
- 2.2.10.2 Each individual item comprising this waste stream is decontaminated before it is placed into the accumulation container. Over time as the container is filled, decon solution (that once clung to the item) collects in the bottom of each container. A sample of this residual decon solution will be taken from the bottom of each container of CAMDS on-site laboratory solid debris generated and analyzed for chemical agent. These waste solids will then be analyzed for TCLP (inorganics and organics) to determine whether further stabilization treatment is necessary prior to final disposal in a RCRA Subtitle C landfill.
- 2.2.10.3 Containers having analytical results demonstrating the agent concentration in the decon solution is below 1 ppm for Lewisite, will be managed off-site in a RCRA Subtitle C landfill. If the Lewisite concentration is above 1 ppm, additional decon must be added to container and reanalysis performed.
- 2.2.11 Maintenance Residues and Non-Metallic Agent Contaminated Debris
- 2.2.11.1 Examples of non-metallic agent contaminated debris are discarded butyl rubber protective equipment which has contacted liquid or vapor chemical agent, discarded maintenance equipment which has contacted liquid or vapor chemical agent, will be managed as hazardous waste P999 and will be containerized disposed at a RCRA subtitle C landfill. Head space monitoring and generator knowledge will be used to determine contamination levels since a representative sample can not be collected..
- 2.2.11.2 Containerized items will be documented in the operating record.
- 2.2.11.3 The chemical agent contaminated debris(i.e., rags, gloves, etc.), and sludges generated from maintenance activities. All maintenance residues will be managed as hazardous waste P999 and will be containerized disposed at a RCRA subtitle C landfill. Head space monitoring and generator knowledge will be used to determine contamination levels since a representative sample can not be collected..
- 2.2.12 Miscellaneous Agent-Contaminated Liquid Wastes
- 2.2.12.1 Samples will be analyzed for TCLP metals and organics, Lewisite, ignitability, corrosivity, and HRA metals. This waste will be containerized and placed into permitted storage until an appropriate management option is identified by CAMDS and approved by the Executive Secretary.
- 2.2.13 Unidentified Waste Streams

Any waste not identified in this plan will be containerized and placed into permitted storage. The Executive Secretary will be notified within 24 hours of the identified waste. A management option shall be provided to the Executive Secretary within 30 days for approval.

2.3 PARAMETER TEST METHODS [40 CFR 264.13(b)(2); R315-8-2.4]

Table 2.2 provides a listing of the test (analytical) methods that will be used to detect and quantify the selected parameters. This information is presented in a relational format in Table 2.1 (the WAP Summary Table).

2.4 SAMPLING METHODS [40 CFR 264.13(b)(3); R315-50-6]

The last column in Table 2.1 (the WAP Summary Table) contains the sampling methods to be used for each waste stream.

2.5 FREQUENCY OF ANALYSES 40 CFR 264.13(b)(4); [R315-8-2.4]

The second to the last column of Table 2.1 (The WAP Summary Table) contains the frequencies at which each waste stream will be sampled and analyzed.

2.6 ADDITIONAL REQUIREMENTS FOR WASTES GENERATED OFF-SITE [40 CFR 264.13(b)(5); R315-8-2.4]

The Chemical Agent Munitions Disposal System does not anticipate receiving wastes from sources outside the Deseret Chemical Depot in its role as a Research, Development and Demonstration unit. If such a need should arise, the generating site will be required to conduct the same analyses as described for analogous waste streams in this waste analysis plan and provide the results to the Chemical Agent Munitions Disposal System prior to shipment of wastes.

2.7 ADDITIONAL REQUIREMENTS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES [40 CFR 264.13(b)(6), 264.17; R315-8-2.4]

Federal regulations require that container storage HWMU managing ignitable and reactive hazardous waste must be located at least 50 feet away from the facility's property line. A review of the facility area map found in Attachment 1 (Facility Description) of the CAMDS RCRA Part B Permit demonstrates the permitted container storage HWMUs associated with CAMDS are all located more than 50 feet away from the DCD property line.

2.8 RECORD KEEPING REQUIREMENTS [40 CFR 264.73(b)(3); R315-7-12.4]

Analytical results generated in compliance with this Waste Analysis Plan are maintained on file at the facility as part of the CAMDS facility operating record.

2.9 SAMPLING AND ANALYSIS QA/QC PROCEDURES

CAMDS will submit a Quality Assurance/Quality Control plan before operations begin as per condition II.A.2.b.

Table 2.1
LEWISITE WASTE ANALYSIS PLAN SUMMARY

WASTE STREAM	Process of Generation	Treatment / Disposal	ANALYTICAL PARAMETERS	ANALYTICAL METHODS ¹	FREQUENCY OF ANALYSIS	SAMPLING METHOD
1. Chemical Agent, Lewisite ²	Not Applicable	LNSC Process	<ul style="list-style-type: none"> Agent Purity, % Total HRA metals Specific gravity 	MIL Spec MIL-L-10658A (L) 6010B, 7061, 7470/7471 2710F	Each Ton Container (TC)	Tap
2. Empty Ton Containers	Ton Container Decontamination (High Pressure Water Rinse)	MPF / Landfill or Smelting	<ul style="list-style-type: none"> Lewisite (vapor concentration) Lewisite (solid/liquid concentration) TCLP metals and organics 	MINICAMS® SOP to be determined 6010B or 7061 8260B, 8270B, 1311, 7470/7471	Each TC Each TC	MINICAMS® Scoop, Tap or Coliwasa
3. Neutralization Process Effluent	LNSC Process	Stabilization then Landfill	<ul style="list-style-type: none"> Lewisite Oxide (concentration) Corrossivity pH 	SOP to be determined 9040A	Completion of each process batch ³ (prior to transfer to T-130)	Tap
4. Spent Decontamination Solutions (SDS-L)	LNSC Operations	LNSC Process Stabilization and Landfill	<ul style="list-style-type: none"> NaOH concentration Lewisite (concentration) TCLP metals and organics 	2320 (alkalinity) SOP to be determined 6010B or 7061, 8260B, 8270B, 1311, 7470/7471	Each tank of SDS-L prior to feed into process (Tank T-140)	Tap
5. Process Equipment/ Tanks	LNSC / ATF	Stabilization / Landfill	<ul style="list-style-type: none"> Lewisite (vapor concentration) TCLP metals and organics Lewisite (rinsate concentration) 	MINICAMS® 6010B or 7061, 8260B, 8270B, 1311, 7470/7471 SOP to be determined	Each Item Each Container	MINICAMS® Trier, Scoop, Chip, or Wipe
6. Carbon Filter Media	ATF Filters	On-site Storage	<ul style="list-style-type: none"> Lewisite (vapor concentration) 	MINICAMS®	Each filter bank change-out, one sample minimum. (3 cycles per sample minimum)	MINICAMS®
7. Other Filter Media(HEPA, Pre-, etc.)	ATF / LNSC	MPF or Stabilization / Landfill	<ul style="list-style-type: none"> Lewisite (vapor concentration) TCLP metals and Organics Lewisite (sample concentration) 	MINICAMS® 1311; 6010B or 7061, 7470/7471, 8260B, 8270B SOP to be determined	Each filter bank change-out, one sample minimum. (3 cycles per sample minimum)	MINICAMS® Thief or Trier
8. Contaminated PPE	ATF	Stabilization / Landfill	<ul style="list-style-type: none"> Lewisite (vapor concentration) Lewisite (liquid concentration) 	MINICAMS® SOP to be determined	Each Container (3 cycles per sample minimum)	MINICAMS®

Table 2.1
LEWISITE WASTE ANALYSIS PLAN SUMMARY

WASTE STREAM	Process of Generation	Treatment / Disposal	ANALYTICAL PARAMETERS	ANALYTICAL METHODS ¹	FREQUENCY OF ANALYSIS	SAMPLING METHOD
9. Lab Waste, Liquids	SAF Lab	Stabilization / Landfill	<ul style="list-style-type: none"> ○ Lewisite (liquid concentration) ○ Corrosivity (pH) ○ Total metals ○ Total VOC's ○ Total SVOC's ○ Ignitability ○ TCLP metals 	SOP to be determined 9040A 3010A, 7471A, 6010B or 7000 series ⁴ 8260B 5030A, 8270B 1010 or 1020A 1311, 6010B	Each Container	Coliwasa
10. Lab & Monitoring Waste, Solids	SAF Lab / Monitoring stations	Stabilization / Landfill	<ul style="list-style-type: none"> ○ Lewisite (vapor concentration) ○ Lewisite (liquid concentration) ○ TCLP metals and organics 	MINICAMS® SOP to be determined 1311; 6010B, 7061, 7470/7471 8260B, 8270B	Each Container	MINICAMS® Thief or Trier
11. Maintenance Residues and Non-metallic agent contaminated debris	Any portion of system	Stabilization / Landfill	<ul style="list-style-type: none"> ○ Lewisite (vapor concentration) ○ TCLP metals and organics 	MINICAMS® 1311; 6010B, 7061, 7470/7471, 8260B, 8270B	Each Container (3 cycles per sample minimum) Each Container	MINICAMS® Thief or Trier
12. Miscellaneous agent contaminated liquid wastes	Any portion of system	On-site Storage	<ul style="list-style-type: none"> ○ Lewisite (vapor concentration) ○ Lewisite (liquid concentration) ○ TCLP metals and organics ○ HRA metals ○ Ignitability ○ Corrosivity 	MINICAMS® SOP to be determined 1311; 6010B, 7061, 7470/7471, 8260B, 8270B, 1010 or 1020A 9040A	Each Container	MINICAMS® Coliwasa

Footnotes:

1. Analytical methods include those unique to Lewisite processing (Army methods), EPA methods (as designated by prefix EPA) and SW-846 methods (all others). Only promulgated SW-846 methods will be used. The most current revision letter will be used within 6 months after promulgation.
2. Lewisite was prepared to known U.S. Government standards. Material Safety Data Sheet (MSDS) for Lewisite is included as Appendix 1 to this WAP.
3. The LNSC a batch-type process in that each >batch' of Lewisite charged to the reactor vessel much be ; approximately 500 lbs of Lewisite can be processed in one neutralization batch.
4. The following SW-846 methods may be used for toxicity characteristic metals determination: 7061A, 7080A, 7130, 7190, 7420, 7741A, 7760.

Table 2.2 Analytical Method Descriptions

Analyte(s)	Method¹	Description/Title
Lewisite % Purity	MIL-L-10658A	Military Specification for Lewisite. Titration method used to determine %L purity.
Lewisite (concentration)	Bubbler-GC/FID	Bubbler containing acid solution is used to collect a sample. The solution is then made basic and acetylene generated by the reaction of hydroxide with the Lewisite is collected and analyzed by gas chromatography and a flame ionization detector. (air and liquid concentration)
	MINICAMS [®]	MINICAMS [®] Detector (air concentration)
Lewisite(extraction)	(2)	DWS extraction for Lewisite contaminated soil or other solid matrices.
Ignitability	SW-846 1010	Pensky-Martens Closed-Cup Method for Determining Ignitability
	SW-846 1020A	Setaflash Closed-Cup Method for Determining Ignitability
Toxic Metals & Organics	SW-846 1311	Toxicity Characteristic Leaching Procedure.
Metals	SW-846 3010A	Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP Spectroscopy.
Metals	SW-846 3050A	Acid Digestion of Sediments, Sludges, and Soils.
Organics	SW-846 3510B	Separatory Funnel Liquid-Liquid Extraction.
Organics	SW-846 3520B	Continuous Liquid-Liquid Extraction.
Organics	SW-846 3540B	Soxhlet Extraction
Organics	SW-846 3580A	Waste Dilution.
Organics	SW-846 5030A	Purge & Trap for Aqueous Samples
Organics	SW-846 5030A	Purge & Trap and Extraction for Soils and Solid Samples
Metals	SW-846 6010B	Inductively Coupled Plasma (ICP) - Atomic Emission Spectroscopy.
Arsenic	SW-846 7061A	Arsenic by Atomic Absorption (AA) -- gaseous hydride
Barium	SW-846 7080A	Barium by Atomic Absorption (AA) -- direct aspiration
Cadmium	SW-846 7130	Cadmium by Atomic Absorption (AA) -- direct aspiration
Chromium	SW-846 7190	Chromium by Atomic Absorption (AA) -- direct aspiration
Lead	SW-846 7420	Lead by Atomic Absorption (AA) -- direct aspiration
Mercury	SW-846 7470A	Mercury in Liquid Waste (Manual Cold-Vapor Technique).
	SW-846 7471A	Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)
Selenium	SW-846 7741A	Selenium by Atomic Absorption (AA) -- gaseous hydride
Silver	SW-846 7760	Silver by Atomic Absorption (AA) -- direct aspiration
Volatile Organics	SW-846 8260B	Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique.
Semivolatile Organics	SW-846 8270B	Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique.
Corrosivity	SW-846 9040A	pH - Electrometric Measurement.
Free Liquids	SW-846 9095	Paint Filter Test
Specific Gravity	2710F	Specific Gravity Determination from Water and Waste Water Analyses, 18th Edition

Notes

1. Where an EPA-approved method for analysis exists (SW-846 or equivalent), it shall be used. Methods developed by the Army will be used for those analytes which do not have EPA methods.
2. Solid matrix extraction methods for agents are currently under development at CAMDS.